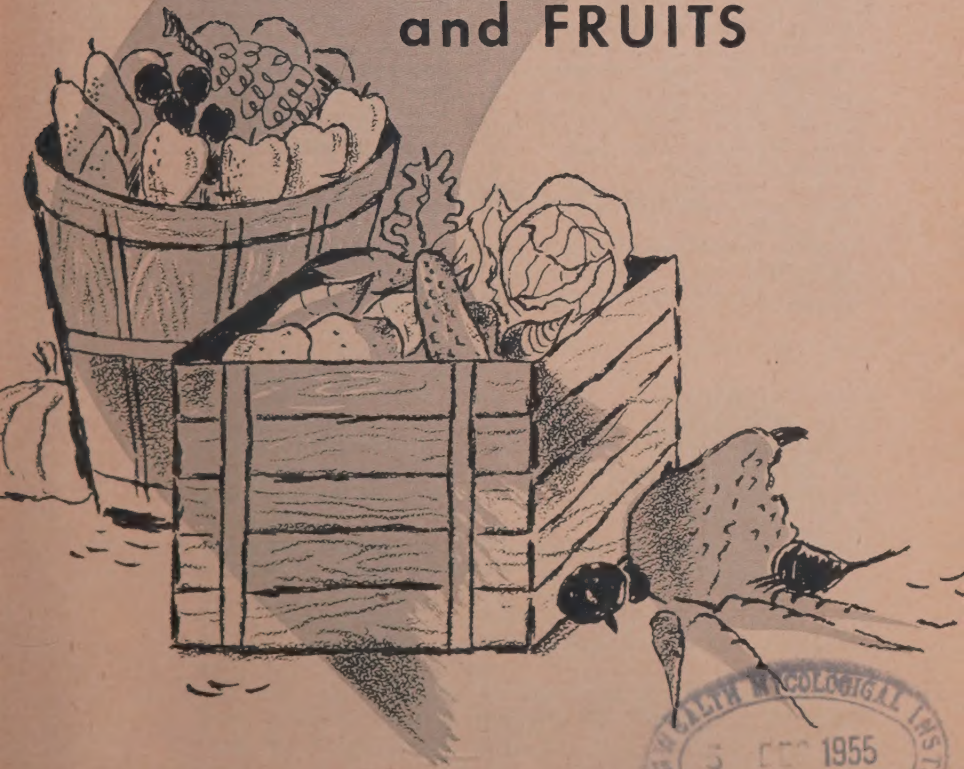
HOME STORAGE of VEGETABLES and FRUITS



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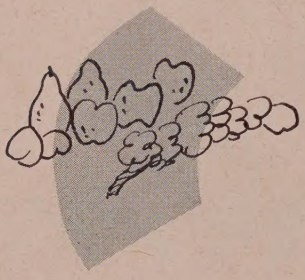
CONTENTS

	Page
General points on storage	1
Facilities for storage	2
Storage room in a home basement	2
Storage cellar under an outbuilding	2
Outdoor storage cellars	3
Storage in pits	8
Keeping the storage space clean	9
Handling the produce	9
Storage of vegetables	10
Beans and peas	10
Late cabbage	10
Cauliflower and broccoli	11
Late celery	11
Endive	13
Onions	13
Storage of vegetables—Con.	
Parsnips	13
Potatoes	14
Pumpkins and squashes	14
Root crops (miscellaneous)	14
Sweetpotatoes	15
Tomatoes	15
Storage of fruits	16
Apples and pears	16
Grapes	16
Peaches	17
Plums	17
Produce that cannot be stored	17
Storage combinations to be avoided	17
Summary of storage recommendations	17



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HOME STORAGE of VEGETABLES and FRUITS

By the *Horticultural Crops Research Branch, Agricultural Research Service*[1]

Advantages of home storage of vegetables and fruits vary with families and types of produce. Among the advantages often realized are lowering of food costs and improvement in the family diet. Farmers and home gardeners who grow their own fruits and vegetables are in position to profit most from home storage; but homemakers have found at times that it is practical to buy produce on local markets and place it in storage. This may provide some insurance against unfavorable changes in market supplies and prices. As used in this bulletin, the term "home storage" means preserving vegetables and fruits in their natural condition, using home facilities rather than commercial installations. Such methods as freezing, canning, and pickling are not considered.

GENERAL POINTS ON STORAGE

Successful storage, particularly of vegetables, is not difficult, providing a few general points are kept in mind. These points are:

1. Different vegetables and fruits require different storage conditions.
2. All products that show signs of decay or mechanical injury should be discarded before storing them.
3. Vegetables and fruits dry out and wilt or wither rather quickly unless the atmosphere of the storage place is kept damp and the temperature maintained as low as possible without actual freezing. Certain vegetables are exceptions to this point, as will be noted under the discussion for individual products.
4. Ventilation is needed in the storage space—not only to change the air to carry off odors, but also to help maintain a desirable temperature and humidity. The windows or ventilators should be opened at night and at other times when the outside temperature is near but not below freezing and the air is not too dry.
5. Walls and ceiling should be insulated to prevent moisture from condensing and dropping on the stored products. Free water will cause decay.

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FACILITIES FOR STORAGE

Storage Room in a Home Basement

A cool, well-ventilated basement under a house offers good conditions for the storage of vegetables and some fruits, but many basements are not well suited because of poor insulation or lack of ventilation. Basements containing a furnace usually are too warm and too dry for extended storage of root crops, but with suitable precautions they can be stored there for 3 or 4 weeks.

It is often possible to partition off a corner or one end of the basement to form a storage room. If the basement is L-shaped, a room can be made by partitioning off the offset.

At least 1 window is necessary in the storage space for cooling and ventilating, and 2 or more are desirable. The windows should be darkened in order to protect the produce from light. They should also be boxed or shaded in such a way as to prevent the entrance of light when they are open.

The size of the storage room is determined by the space available and the amount of material to be stored. Natural earth makes a more suitable floor than concrete or brick, as a certain amount of moisture in the air is desirable—earth floors will insure this if kept damp by occasional sprinkling.

Care exercised in making the frame plumb and square will enable the builder to get the structure tight with a minimum of labor. Scantlings, 2- by 4-inch, should be laid flat to a light concrete footing. The concrete footing will provide protection against damage by termites. From the sill to the ceiling 2- by 4-inch studs should be spaced 16 inches apart from center to center. The door should be located at the most convenient point, but it should be large enough to admit barrels, boxes, or other containers.

A well-constructed wall is made by using plywood sheathing on the outside and inside of the studs with mineral blanket or fill insulation between the studs. A less expensive wall can be built by omitting the insulation between the studs. The ceiling of the storage room should be insulated from heat from the living space above by putting insulating material between the joists and covering with plywood.

Bins may be used as produce containers, but crates and boxes are preferred, as it is possible to remove them for cleaning. It is advisable to construct shelves or a slatted floor to keep the containers off the ground. Placing the containers on shelves or a slatted floor will provide free circulation of air and also protection against rodents.

Storage Cellar Under an Outbuilding

A storage cellar may sometimes be built as the lower story and foundation for an outbuilding, such as a barn or shop. When this is done, the lower story, or cellar, should be almost entirely underground. The outside walls, which may be of concrete, brick, stone, or tile, should be insulated by banking them with earth. The underside of the ceiling joists should be insulated by sheathing with plywood or tongue-and-groove siding and filling the space between the joists with dry sawdust or shavings. Peanut, rice, or cottonseed hulls, if kept dry, are also effective insulating materials.

The entrance to the storage cellar may be from the room above or through an outside door reached by steps or a grade entrance.

Ventilation can be provided by running a flue from the ceiling of the cellar up through the roof of the building or by placing ventilators in the side walls of the cellar near the ceiling. Air-inlet ducts should be near the floor, and their outer ends covered with wire screen.

Outdoor Storage Cellars

Outdoor storage cellars are excellent for the storage of many vegetables and some fruits. They possess all the advantages of a storage room in the basement and are superior in some respects: (1) The outdoor storage cellar can be maintained at a uniform temperature over a long period; and (2) it is possible to keep the cellar cool and to reduce the temperature of the stored produce to the desired point for safe storage. Reduction in temperature is obtained by opening the door during the night if the outside temperature is above freezing but cooler than that inside and closing it in the morning before the air becomes warm. Ventilators should be kept tightly closed except when the outside air is cooler than that within the cellar, when they should be opened, unless the outside temperature is so low that damage from freezing may occur.

The cellar should be convenient to the kitchen.

If apples or other fruits are to be stored, it is desirable to have a two-compartment cellar, one for vegetables and one for fruits, with separate intake and ventilating flues for each compartment.

Since the outdoor cellar or storeroom must be kept free from frost and excess moisture, its type and construction will vary with the geographical location. In the southern part of the country, the structure is usually entirely aboveground and protected by only a few inches of sod and by straw, hay, or leaves. In northern sections outdoor cellars are built almost entirely belowground and covered with 1 to 2 feet or more of earth.

Pole-and-Plank Storeroom

A cheap aboveground storage room suited to conditions in the southern sections of the United States may be built on a well-drained site by using poles and planks as the main structural parts (fig. 1). To make this type of storage, a row of posts is set 5 to 6 feet apart, with the posts extending 7 or 8 feet above the ground. A ridge pole is then placed on top of the posts. A row of planks or puncheons is leaned against each side of the ridge pole, with the opposite ends of the planks resting in a shallow trench 4 or 5 feet from the center line of posts. The gable-shaped structure is closed by boarding up the ends, except a space for a door in one end. The roof is covered with sod to a depth of 5 or 6 inches and may have an additional covering of straw, hay, or leaves.

Partly Underground Cellars

In sections where low temperatures prevail, it is necessary to have storage space well insulated. One type of cellar common in northern sections of the country has walls of masonry that extend just above the surface of the ground (fig. 2). The frame roof is erected on plates, which are set on the walls. The underside of the rafters is ceiled, and

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Figure 1.—An inexpensive outdoor storage that can be used in mild climates for storing sweetpotatoes and other crops. It consists of a pole-and-plank frame covered with sod and straw.

an insulating material, such as mineral wool, dry sawdust, or shavings, is packed in the spaces between the rafters. Sheathing, paper, and roofing material are used to complete the roof. A ventilating flue in the roof provides ventilation. Temperature control is easier in this type of cellar than in structures that are entirely aboveground, and less insulation is needed. A sidehill location for partly underground cellars makes it possible to use a grade entrance to store and remove produce without climbing steps.

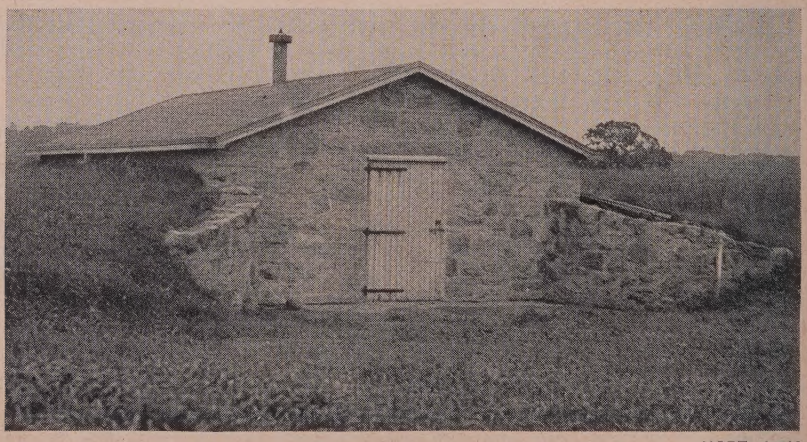

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Figure 2.—A partly underground storage cellar with stone walls and insulated frame roof. This type of cellar will keep produce from freezing in cold climates.

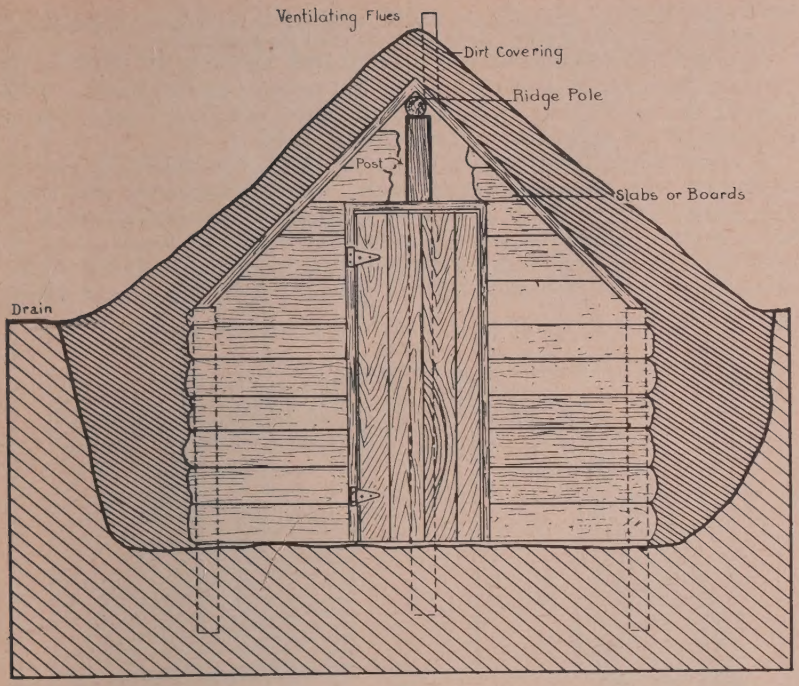

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Figure 3.—End view of post-and-plank outdoor storage cellar, showing the frame covered with soil. Manure, straw, or corn fodder may be placed on top of the dirt to provide additional insulation.

Posts and planks can also be used to build a cheap storage cellar partly or completely underground (fig. 3). The excavation for this type of cellar should be approximately the size of the proposed structure. The excavated soil should be piled nearby and used for covering the roof and banking the sides. The first step in constructing the frame is to set 2 rows of posts of uniform height in the bottom of the pit near the side walls and a middle row of posts about 5 feet higher than the outside posts. The center row supports a ridge pole, and plates are laid on the two outside rows. A roof of planks or puncheons can then be put in place. After the ends are closed the whole structure except the door is covered with soil, the thickness of the covering depending on the climate.

This type of storage cellar is low in cost, but it is short-lived, as conditions in the cellar are favorable for wood decay.

Concrete Cellars

Concrete storage cellars cost more than those built of wood, but are permanent structures (fig. 4). Concrete has several advantages over brick, stone, or other decay-resisting materials. Unskilled labor can be used to build a small concrete cellar. The arched roof and walls can be poured as one solid unit and thus make the concrete

cellar structurally superior to other types. It is easy to waterproof concrete, a feature highly desirable in a storage cellar.

Detailed information on the mixing and handling of concrete is given in Farmers' Bulletin 1772, Use of Concrete on the Farm. This bulletin can be obtained from the Office of Information, United States Department of Agriculture, Washington 25, D. C.

A well-drained location convenient to the house should be chosen as the site for a concrete storage cellar. Sidehills make the best sites. The excavation should be just large enough for the earthen walls to serve as the outside form for the concrete. Board forms must be used for that portion of the wall that is aboveground. Inside forms are usually made of boards held in place by 2 by 4's spaced about

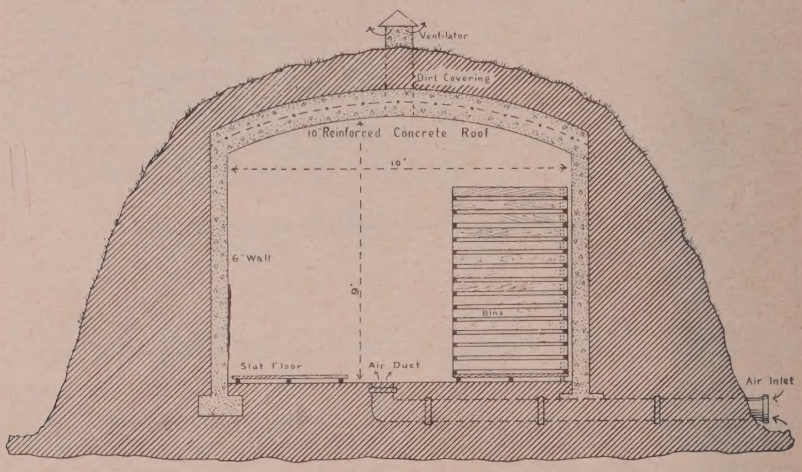

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Figure 4.—Cross section of a concrete storage cellar, showing the arrangement of ventilators, slat floors, and bins. Air from the floor inlet circulates under and around stored produce.

18 inches apart. Supports for the roof form must be placed along the top of the inside forms for the side walls. The form for the arched roof is started by setting a line of posts midway between the side walls and placing a plate on top of the posts. The plate must be a few inches higher than the side walls. Form boards are laid across the plate and the ends sprung down and secured to the inside forms for the side walls. Concrete for the roof and walls should be poured at the same time to eliminate joints. An arch makes a strong roof and helps in ventilating the cellar. Another advantage of the arch is that moisture which condenses on the ceiling will drain to the side walls instead of dripping on the stored produce.

The whole structure, with the exception of the door, is covered with earth to prevent freezing. The thickness of the covering should vary with geographical location. In northern sections of the country, 2 to 3 feet may be necessary. Straw, fodder, or manure may be used for additional insulation. It may be necessary to close the air inlet and ventilating flue in severely cold weather. Wire screen over the outside ends of the duct and flue will keep out birds and small animals.

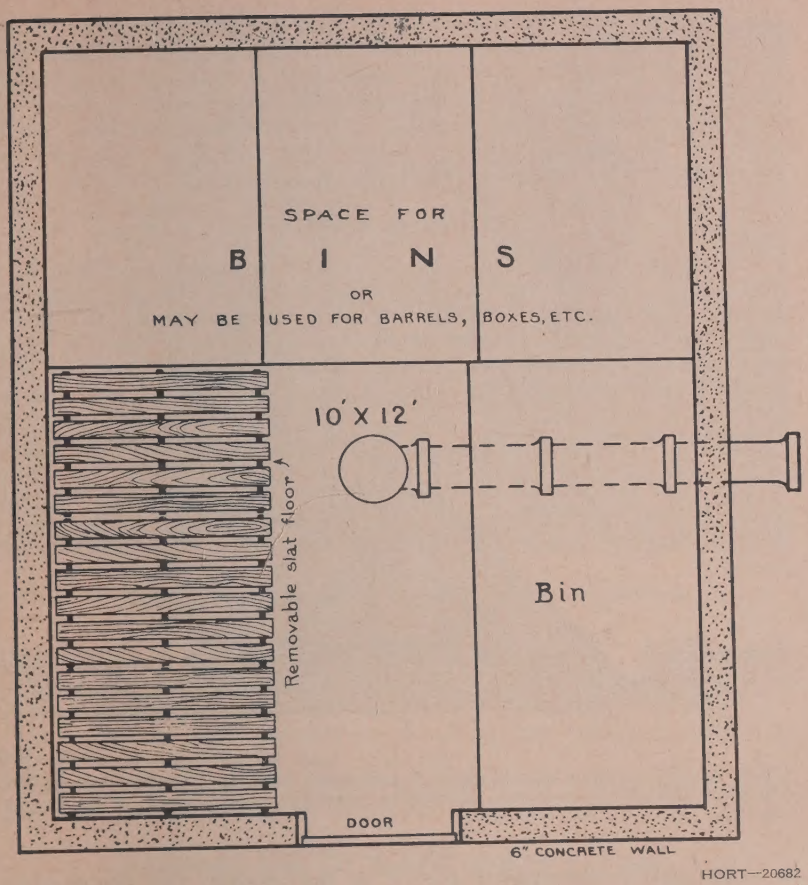

Figure 5.—Floor plan of a simple concrete storage cellar with an earthen floor. Removable slat flooring keeps the containers out of contact with the moist soil.

Dimensions of concrete cellars will vary according to family needs. Figures 4 and 5 illustrate a cellar 10 feet wide, 12 feet long, and 8 feet high. A cellar this size will hold the produce of an acre garden. Middle piers for supporting the roof should be installed in cellars wider than the one illustrated. The 6-inch concrete walls in this cellar are reinforced with ⅝-inch iron rods. Ventilation is provided by a ventilating flue in the roof and an air inlet in the floor. Glazed terra cotta pipe may be used for the floor inlet, and these ducts should be not less than 12 inches in diameter for a cellar this size.

Wood-Frame House

An aboveground type of storage house used in many sections of the North is a small frame building with walls 10 to 12 inches thick. The walls are filled with an insulating material, such as dry sawdust or shavings. Tight walls can be made by sheathing both the inside and outside of the frame with matched lumber. Rafters are ceiled on

the underside with the same material and spaces between the rafters are filled with dry insulating material. The use of building paper in the roof and walls is of great assistance in making the structure tight. Vaporproof paper on the inner side of the insulation keeps the insulation material dry. Ventilation for the frame building can be provided by the same type of roof flue and floor inlet that is recommended for concrete cellars (figs. 4 and 5).

Storage in Pits

Cone-shaped outdoor pits (fig. 6) are often used for keeping such vegetables as potatoes, carrots, beets, turnips, salsify, parsnips, and cabbage; and are sometimes used for winter apples and pears. The conical pit may be built on the surface of the ground, or in an excavation 6 to 8 inches deep in a well-drained location. The construction of the pit preferably is as follows: A layer of straw, leaves,

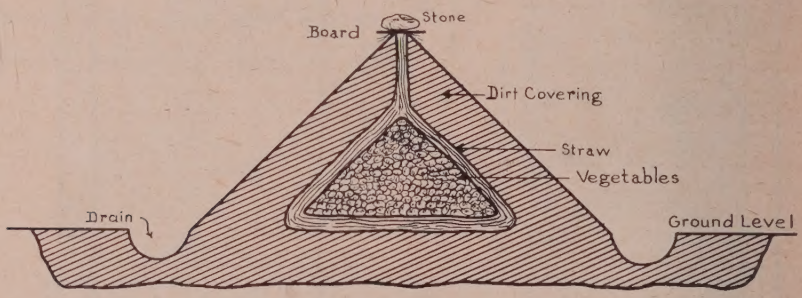

Figure 6.—Cross section of a storage pit containing potatoes. During severely cold weather the soil covering may be supplemented by manure, straw, or similar material.

or other similar material is spread on the ground, and the produce is stacked on the litter in a conical pile. More litter is used to cover the produce, and the entire pile is covered with 2 or 3 inches of soil, which is firmed with the back of a shovel to make it waterproof. More soil may be needed as winter approaches. A shallow drainage ditch should be dug around the pit to carry away water.

The amount of ventilation necessary will depend on the size of the pit. Small pits containing only a few bushels of vegetables will receive sufficient ventilation if the straw between the vegetables and soil is allowed to extend through the soil at the apex of the pile. This should be covered with a board or piece of sheet metal held in place by a stone to protect the produce from rain. In larger pits ventilation may be obtained by placing two or three pieces of rough boards or stakes up through the center of the pile of vegetables so that a flue is formed. This flue is capped by a trough formed of two pieces of board nailed together at right angles.

It is difficult to get produce out of conical pits in cold weather, and when a pit is opened it is desirable to remove its entire contents at once. For these reasons it is advisable to construct several small pits rather than one large one, and to place a small quantity of several kinds of vegetables in the same pit. This makes it necessary to open

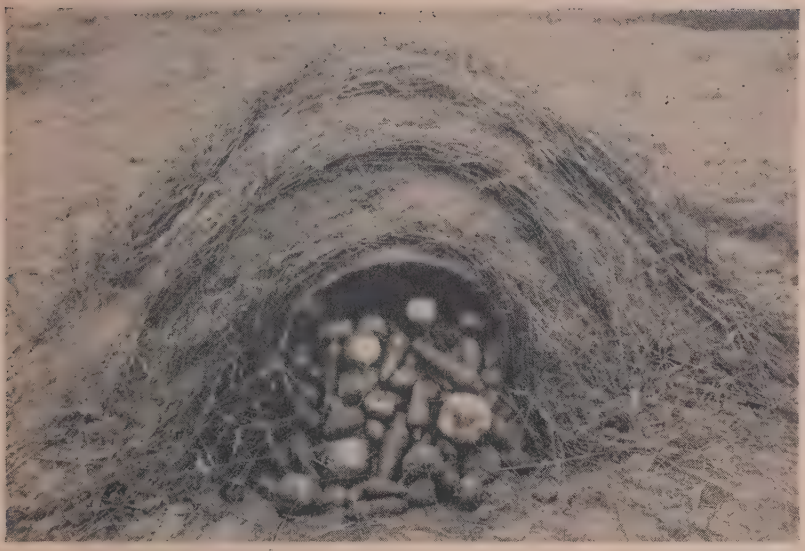

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Figure 7.—Home storage pit made by covering a barrel with straw and earth.

only one pit to get a supply of all kinds of produce. When several crops are stored in the same pit it is a good plan to separate them with straw or leaves.

Another type of pit consists simply of an open barrel covered with successive layers of straw and earth (fig. 7).

Pits should be made in a different place every year to avoid decay from contaminated material remaining in an old pit.

KEEPING THE STORAGE SPACE CLEAN

Basement storage rooms and outdoor storage cellars should be kept clean. Decaying material should be removed as soon as it is discovered. At least once a year all movable containers should be removed from the storage space for cleaning. Scraping and scrubbing, followed by whitewashing, is recommended.

Permanent bins are more difficult to clean than movable containers, and for this reason are less desirable.

HANDLING THE PRODUCE

Produce intended for storage should be handled carefully at all times to avoid bruises and skin breaks. All mashed, cut, or decaying specimens should be removed. If unsound produce is placed in storage, serious losses from decay are likely to result, especially if the temperature in the storage space cannot be kept below 50° F.

Waxing vegetables for home storage is not recommended, although wax has been used for several years with certain perishable produce to improve its appearance for sales purposes and to minimize shrinkage.

If apples or other fruit are to be stored in a basement or outdoor storage cellar, it is desirable to have separate compartments for fruits

and vegetables. Each compartment should have its intake and ventilating flues. If pits are used for storage, fruits should be stored in pits separate from those used for vegetables.

STORAGE OF VEGETABLES

Since most families want to store more vegetables than fruit, storage areas are usually designed primarily for vegetable storage. Different vegetables require different storage conditions, and the secret of keeping quality of produce high and storage costs low is to provide the variety of conditions demanded by the variety of vegetables stored. Conditions under which individual vegetables keep best are given in the following pages.

Beans and Peas

All kinds of dry beans may be kept for winter use by picking the pods as soon as they are mature and spreading them in a warm, dry place until they are thoroughly dry. The beans are then shelled and stored in bags hung in a cool, dry, well-ventilated place until needed. Cellars are likely to be too damp for storing beans.

Navy beans and other dry beans can be allowed to mature on the vines until a maximum number of pods are ripe. Then the whole plants are pulled and cured like hay. After thorough drying the beans are shelled and stored as suggested above, or they can be placed in fruit jars or cans. A few drops of carbon bisulfide in each container will make control of weevils more certain. This substance is flammable and must be kept away from fire, but it will not affect the flavor of the beans or their germination.

Dry lima beans, soybeans, and peas may be treated like dry beans and stored in the same manner.

Late Cabbage

Heads of late cabbage may be stored in ventilated containers in outdoor storage cellars, or they may be placed in conical pits. Another satisfactory method is to store the cabbage in a long pit (fig. 8). When cabbage is stored in this manner, it is pulled out by the roots and the entire plant is placed head down and covered with soil. The advantage of long pits over conical pits is that only a few heads may be removed without disturbing the rest of the pit.

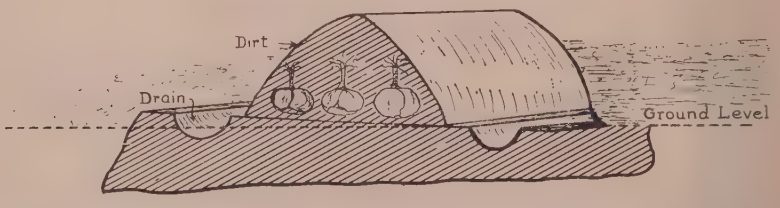

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Figure 8.—Cabbages stored in a long pit. This type of pit must be well drained. The soil covering for cabbage does not have to be so thick as the covering for vegetables that are more easily injured by frost.

Another good method is to store the cabbage in a pit made of stakes and poles covered with straw (fig. 9). The plants are pulled by the roots and set side by side, with the roots in shallow trenches. Enough 8- to 10-foot trenches are dug to hold the number of cabbages to be stored. A frame is erected around the bed after the trenches have been filled with cabbages and soil packed around the roots. The frame is made of rails, boards, or poles or of stakes driven into the ground and should be about 2 feet high. Soil is banked around the frame, and poles are placed across the top to hold the covering of straw, hay, or corn fodder. Heads are removed by cutting them off with a knife, leaving the roots in position. The roots will sprout in the spring and

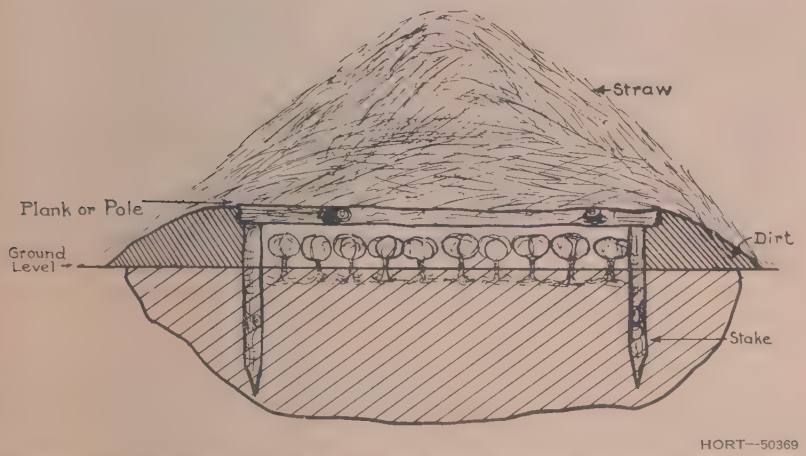

Figure 9.—Cross section of a cabbage storage pit made of stakes and poles covered with straw.

supply the family with an abundance of greens. This type of storage is inexpensive and gives good results.

Heads of cabbage may be laid in rows on shelves in an outdoor storage cellar but not in a storage room in the basement of a dwelling, as the odor is likely to penetrate through the house.

Cauliflower and Broccoli

Cauliflower and broccoli cannot be preserved in ordinary home storage facilities. However, they can be held satisfactorily at 32° F. for a period of 2 to 3 weeks.

Late Celery

Celery plants may be stored for a month or more in the garden right where they grew, by banking enough earth around the standing plants to prevent freezing. To store by this method a few inches of soil is banked around the base of the plant at the end of the season, and the banking is built up to the top of the plants before severe freezing is likely to occur. As the weather becomes colder the ridge is covered with coarse manure, straw, or corn fodder held in place with boards. The objection to this type of storage is that it is hard to get celery out when the ground is frozen.

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Figure 10.—Trenches for storing celery. Plants are packed closely in the trenches, and a sloping roof is built for protection.

Another method of storing celery is to dig a pit 10 to 12 inches wide, about 24 inches deep, and any desired length (fig. 10). Soil in the bottom of the pit is loosened or enough loose soil is shoveled in to form a bed in which to set the roots of the celery. Fully grown plants with considerable soil adhering to the roots are closely packed in the trench. Celery is watered as it is placed in the trench, and the trench is left open long enough for the tops to dry off. Unless the soil is very dry at the time of storing or extended warm weather follows, it will not be necessary to water again. A covering for the trench is started by setting a 12-inch board on edge beside the trench and banking the board with earth. A sloping roof of boards, poles, or cornstalks from which the tops have been removed is then placed across the pit with one end resting on the upright board and the other end on the ground. A light covering of straw or other material that will pack closely is spread over the roof, and the covering is increased as the weather becomes colder. Celery stored in this manner will keep until late winter.

The unused pit of a permanent hotbed may be utilized as a storage place for celery by removing surplus earth and substituting a covering of boards for the sash. Celery is packed in the hotbed in the same manner that is described above for storing in a trench (fig. 11). The bed may be covered with any material that will keep out frost.

Celery may be stored on the floor of a storage room in the basement of a dwelling or in an outdoor storage cellar. For this type of storage the plants are taken up just before freezing occurs, with considerable soil adhering to the roots. They are set on the floor with the roots down and packed together as closely as possible. If moderately moist, the celery will keep well for 1 to 2 months under the conditions

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Figure 11.—Celery stored in a hotbed pit.

found in most storage cellars. Celery should not be stored in a cellar with turnips or cabbage, as the celery will absorb the odor of these vegetables and its flavor will be ruined.

Endive

Endive placed in the storage cellar under the conditions described for cellar storage of celery will keep for 2 to 3 months. The leaves are tied over the crown or center to assist blanching.

Onions

To keep well, onions must be mature and thoroughly dry. Onions with thick necks and those that have been injured will not keep and should be used immediately. Sound onions should be stored in baskets, crates, or loosely woven bags. Good ventilation is essential. A dry, well-ventilated place such as an attic or unheated room furnishes good storage space for onions; cellar conditions are not recommended. Slight freezing does no harm, provided onions are not handled while frozen. The home gardener will usually find that onions grown from sets are difficult to keep. A procedure recommended for onions grown from sets is to place them in a single layer, necks down, on poultry netting that is suspended in an airy shed.

Parsnips

Parsnips may be left in the ground to be dug as needed, since freezing does not injure them. They actually improve in flavor after being kept near freezing for a few weeks. It is advisable to store a small quantity in the storage room in the basement or in an outdoor

storage cellar for use during periods when the ground is frozen. Parsnips may also be stored in small piles or in well-ventilated containers in cellars or in conical pits.

Potatoes

Potatoes that are to be stored for only a month to 6 weeks before being used may be stored under different conditions than potatoes that are to be stored for the winter. Storage for a short period may be at a temperature between 50° and 60° F. Potatoes held within these temperatures cook better and do not acquire the undesirable sweetness of potatoes held in long storage at temperatures below 40°. However, at the higher range they will sprout sooner than at 40°.

Long time storage may be in basement cellars, in outdoor cellars where the temperature remains at about 40°, or in conical pits. Barrels, boxes, baskets, crates, or bins on the floor may be used for holding potatoes stored in cellars. They must be protected from light. It is a good plan to place the major part of the crop in pits and a small quantity for immediate use in a basement or outdoor cellar.

In case potatoes become undesirably sweet because of a low storage temperature, they usually can be desugared by holding at ordinary living-room temperature for a week or two.

Potatoes that are exposed to late blight in the field at harvesttime should not be stored, as the infection would likely spread and cause severe loss.

For more detailed information on the storage of potatoes, see United States Department of Agriculture Farmers' Bulletin 1986, Potato Storage. This bulletin can be obtained from the Office of Information, United States Department of Agriculture, Washington 25, D. C.

Pumpkins and Squashes

Well-matured pumpkins and squashes may be kept in dry, well-ventilated cellars, but a better place is in the basement of the house near the furnace. Pumpkins and squashes keep best when placed in rows on shelves. Late-maturing varieties of these vegetables will keep until late winter if the temperature is maintained at 50° to 60° F. A preliminary curing at 80° to 85° for about 2 weeks helps to ripen immature specimens and to heal mechanical injuries produced during harvesting.

Root Crops (Miscellaneous)

Root crops such as beets, carrots, celeriac, kohlrabi, salsify, turnips, winter radishes, and horseradish are not stored until late fall. The roots should be pulled and topped when the soil is dry. If roots are to be held in a storage cellar in the basement or in an outdoor storage cellar, they should be placed in crates or in ventilated boxes or barrels. If sufficient space is available in the storage cellar, it is a good plan to place them in small piles along the wall. Storage in large piles should be avoided, as it is liable to cause heating and decay. Roots dry out and wilt very rapidly if kept too dry. The humidity of the storage room should be very high.

Conical pits (see p. 8) make excellent storage space for root crops. Roots to be stored in conical pits are prepared the same as roots for cellar storage—they are pulled and topped in the fall when the soil is dry.

Turnips may be left in the garden later than most other crops. They withstand hard frost, but are injured by alternate freezing and thawing. Turnips must not be stored in the basement of the dwelling, as they give off odors noticeable in the house.

Sweetpotatoes

Sweetpotatoes should be mature when dug and should be handled carefully at all times, as they are easily bruised. A warm moderately dry place is preferable for storing. This crop may be kept in pits or outdoor storage cellars, but a relatively heavy loss from decay may be expected. Sweetpotatoes stored in pits are handled in much the same way as other root crops.

When kept in a specially constructed storage house, either in bulk or in crates, sweetpotatoes will keep much better if they are first cured for about 10 days or 2 weeks at a temperature of 80° to 85° F. The relative humidity should be kept high during the curing process, but not so high that free water accumulates on the surface of the stored produce or on the walls of the storage room. If the above curing conditions are not available, newly harvested sweetpotatoes will be benefited by stacking in covered containers near a furnace or stove for 2 or 3 weeks. Sweetpotatoes should not be handled after the curing period. The temperature should be reduced to about 55° to 60° and maintained as near this range as practicable for the rest of the storage period.

Well-matured, well-cured, and carefully handled sweetpotatoes held at a uniform temperature of about 55° to 60° F. may be kept throughout the winter and spring. When only a few bushels are to be stored, they may be placed in a warm, dry basement. A small supply may also be placed near the chimney on the second floor or near any other place where the temperature will be about 55° to 60°.

For more detailed information on the storage of sweetpotatoes, see Farmers' Bulletin 1442, Storage of Sweetpotatoes. This bulletin may be obtained by writing to the Office of Information, United States Department of Agriculture, Washington 25, D. C.

Tomatoes

The fresh-tomato season can be extended for about 4 to 6 weeks in the fall by properly storing the fruits. One method of storage consists simply of pulling the vines with tomatoes attached when the first frost threatens, but before frost occurs, and hanging the entire plant in a basement or other location where the temperature will not get below 50° to 55° F.

A better way to store tomatoes is to store sound, well-matured (but not ripe) fruits in shallow trays in a moderately dry, well-ventilated cellar or outbuilding where the temperature will be maintained close to 55° F. Ripening will proceed slowly at temperatures between 55° and 60°, and the ripened fruits will remain sound up to 6 weeks if kept within this temperature range. A moderate amount of light may cause better ripening color, but otherwise it is immaterial

whether the storage place is light or dark. If the tomatoes are separated into different stages of maturity, the riper fruits can be removed as needed without disturbing the others. An occasional sorting is desirable to remove decayed fruits.

Tomatoes taken from nearly spent vines are inclined to be of poorer quality and more likely to decay than fruit from vines in the prime of production. Therefore, if it is desired to extend the season as late as possible with good-quality fruit, a late-planted crop should be grown for this purpose.

STORAGE OF FRUITS

It will probably pay to provide special storage facilities for fruit if a large quantity is to be stored. Usually, the kind and amount of fruit desired can be stored in the same way as vegetables. The following information on fruit storage will help the home owner to plan a storage system for his particular needs.

Apples and Pears

Late-maturing varieties of apples and pears may be kept in a storage room in the basement of a dwelling, in outdoor cellars, or in pits. These fruits should not be placed in the same storage space with vegetables if it is possible to have separate storage, because the fruit may absorb unpleasant odors. The length of the storage period for apples and pears differs, depending on varieties, the temperature of the storage space, and the maturity of the fruits when stored. Ripe fruits will not keep so well as fruits that are mature but firm when picked. Unripened Kieffer pears, for example, will keep for 8 to 10 weeks at a temperature close to 32° F. If ripe when stored, they cannot be expected to remain in good condition more than 2 or 3 weeks, regardless of the temperature. Unripe pears can be ripened at 60° to 70°.

Apple and pear varieties that keep well may be stored in pits as described for root vegetables, but the extra labor required is hardly justified for storing short-keeping varieties or fruit that is already ripe. Apples and pears that keep a relatively long time under average home storage conditions are varieties that are customarily harvested close to the onset of cold weather. These include such apples as Baldwin, Rhode Island Greening, Winesap, and York Imperial and such pears as Kieffer, Duchess, Bosc, Comice, and Winter Nelis. The last-named variety should remain in good condition most of the winter. When pears are removed from storage while still hard and immature, they will ripen to good quality if held at 60° to 70° F.

Apples and pears often spoil if placed in pits or cellars before freezing weather arrives. The fruit can be held temporarily in an open shed or under cover in the shelter of a tree, where they will remain colder than in permanent storage where they must be placed when the weather becomes cold. Apples and pears do not freeze until exposed to a temperature below 28.5° F.

Grapes

In northern sections it is possible to keep grapes for a month or two, provided they are clean and fully ripe and are stored in a cool, moderately moist place. A temperature slightly below 32° F. will do no

harm, since grapes do not freeze until the temperature falls to 28° or lower. The fruit should be held in closed but not airtight containers in a place where it cannot absorb undesirable odors. Among the varieties produced in the East, Catawbas have the best keeping quality, but other varieties can be kept satisfactorily under the conditions just described.

Peaches

Peaches cannot be satisfactorily stored for more than a few days unless refrigerated. The most satisfactory storage temperature is 31° to 32° F. At this temperature well-matured—but not overripe—peaches can be held for 2 to 4 weeks. Deterioration is indicated by loss of bright, live color; loss of flavor; and browning of the flesh, especially around the stones.

Plums

In the North plums such as Damson, Italian Prune, Pond (Hungarian Prune), and Golden Drop can be held satisfactorily in a moderately moist, cool basement or storage cellar for a month to 6 weeks. Plums are not adapted to pit storage.

PRODUCE THAT CANNOT BE STORED

It is not possible even in cold storage to hold peppers, eggplants, and the more common types of watermelons and muskmelons in edible condition for more than about a month. The maximum storage period in a home basement or outdoor cellar for some of these would be only a few days and for others possibly 2 weeks.

STORAGE COMBINATIONS TO BE AVOIDED

Unless storage space is extremely limited, apples should not be stored with cabbage, potatoes, or most root crops; and celery should not be stored with turnips or cabbage. Apples and celery will absorb odors from the other produce and acquire unpleasant flavors. Turnips and cabbage should not be placed in the basement of a dwelling, as they give off odors that are unpleasant throughout the house. Dairy products and eggs readily absorb odors and should not be stored in the same space as vegetables and fruits.

SUMMARY OF STORAGE RECOMMENDATIONS

The general storage recommendations for the various commodities are summarized in table 1.

TABLE 1.—*Places recommended for home storage of vegetables and fruits, length of storage period, and recommended temperature and humidity*

Commodity	Place to store [1]	Length of storage period	Temperature [2]	Humidity
Vegetables:				
Dry beans and peas	Any cool, dry place	As long as desired	Cool	Dry.
Late cabbage	Pit, trench, or outdoor cellar	Through late fall and winter.	do	Moderately moist.
Cauliflower and broccoli		2 to 3 weeks	32° F	Do.
Late celery	Pit or trench; roots in soil in storage cellar.	Through late fall and winter.	Cool	Moist.
Endive	Roots in soil in storage cellar	2 to 3 months	do	Do.
Onions	Any cool, dry place	Through fall and winter	do	Dry.
Parsnips	Where they grew, or in storage cellar.	do	Cold; freezing in soil does not injure.	Moist.
Various root crops	Pit or in storage cellar	do	Cool	Do.
Potatoes	do	do	See text	Do.
Pumpkins and squashes	Moderately dry cellar or basement.	do	50° to 60° F	Moderately dry.
Sweetpotatoes	do	do	55° to 60° F	Do.
Tomatoes (mature green)	do	4 to 6 weeks	do	Do.
Fruits:				
Apples	Storage cellar, pit, or basement.	Through fall and winter	Cool	Moderately moist.
Pears	Storage cellar	See text	do	Do.
Grapes	Basement or storage cellar	1 to 2 months	do	Do.
Peaches	do		do	Do.
Plums	do	4 to 6 weeks	do	

[1] Always avoid contact with free water that may condense and drip from ceilings.
[2] Cool indicates a temperature of 32° to 40° F.; avoid freezing.

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